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FIFTY-EIGHTH YEAR

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SAN JUAN PLANT OF PORTO RICO GAS COMPANIES WHERE PRESSURE RECORDS WERE TAKEN DURING HURRICANE

Though Subjected to Hurricane for More Than Four Hours Porto Rico Gas Plants Sustain No Damage

Pressure Chart at San Juan Plant Indicates Little Effect of Strain on Pressures in Holder—Crops and Poorly Constructed Buildings on Island Damaged to Extent of $1,000,000—Gas Service Continued Uninterrupted, Though Electric Light, Street Railways and Telephone Systems Were Put Out of Business for 24 Hours

DOES IT PAY TO BUILD RIGHT?

San Juan and Ponce Gasholders

were designed and constructed by us in accordance with our Standard Practice

CRUSE-KEMPER CO. - - AMBLER, PENN.

We carry Steel in Stock for Holders, Purifiers and Tanks

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KOPPERS

BY-PRODUCT

COKE AND GAS OVENS

The most efficient method of carbonizing coal is in KOPPERS OVENS and the best coke and by-products are produced by this process.

H. KOPPERS COMPANY

Pittsburgh, Pa.

Builders of

By-Product Coke and Gas Plants
Tar Distilling Plants
Ammonia Recovery Plants
Benzol Recovery Plants

Exhibitors at the Second National Exposition of Chemical Industries, Grand Central Palace, New York City, Week of September 25th.

1859 FIFTY-EIGHTH YEAR 1916

AMERICAN

GAS LIGHT JOURNAL

VOL. CV., No. 12. NEW YORK, SEPTEMBER 18, 1916 WHOLE No. 3,054.

Construction of Furnaces of the Surface Combustion Type are Rapidly Changing and Obtaining a Wider Adaptation Ranging from Domestic Gas Stove to Carbonization of Coal

Original Furnaces Were of Crucible Type Whereby Retort was Surrounded by Body of Broken Refractory Material, of Such Mesh and Shape as to be Permeable in Nature, which was Brought to Incandescence by Admission of Explosive Mixture Entering at High Combustion—Method of Future will be Secondary Furnace Lining or Series of Burners of Radial Type

By NISBET LATTA

Author of American Gas Practice and American Producer Gas and Combustion Engineering

The matter of combustion engineering, whether applied to power, heat, or any other form of potency, must be considered under two divisions; namely, the general and the specific. Under the first comes the volume and nature of the fuels and the rapidity of their convolutions. Under the second comes the efficiency of their application. This may be taken as a general concept.

Let us say, for instance, that in starting, we observe the differentiation of "Heat" and "Temperature." The function of the latter is directly of the former, but the ratio is necessarily variable.

We may lay down, as a fundamental law, the formula that:

A=Theoretical

$$\frac{\text{B. T. U.}}{W \times S} = T$$

T=Temperature

B=Practical

$$\frac{\text{B. T. U.} \times T_2}{W \times S} = T$$

T_2=Time element in unit space.

in which B. t. u. means the number of heat units which are divided by the specific heat of the affluent products of combustion multiplied by their weight. The second law involves the liberation of unit heat within unit space, within unit time; local conditions of conservation, radiation, etc., being more or less an accessory, which probably affect less influence than is generally allowed.

Flow of Gas Through Orifice Practically Constant Until 50 Per Cent Back Pressure Occurs

One of the essentials which should be considered as fundamental should be that of the regulation of fuel supply, and one of the great difficulties which has been encountered has been certain theoretical laws (Boyles Formula included) as to the rate of the flow of the gas through an orifice. As a matter of fact, the flow of a gas through an orifice empirically, is practically constant until upon the negative or opposite side to the point of admission of the aperture, a back pressure of 50 per cent of the initial pressure occurs. When this happens, there is a depressent curve. This is one of the fundamentals of all gas furnaces, gas manufacture (especially coke ovens) and gas manufacturing work. It goes to show that the control of air for an efficient combustive or explosive mixture, one which has never been taken into serious consideration, and the throttling or control of which has been but most inadequately undertaken, should be, the elementary or primary consideration.

We find what is practically a newly developed school of science, known as physical chemistry. This involves, either through the medium of heat, pressure, velosity of mechanical distribution; a coalition, affording an intimate mixture at the nearest possible vapor tension of air and gas for the maximum efficiency of combustion. This involves an addition to the thermal conditions and the catalytic effect of heat and is known as mass action.

Again, we must constantly bear in mind that the service performed for any requirements must depend absolutely upon the liberation of unit volumes of heat within unit space, within unit time, with a minimum of abstracted heat due to radiation or conduction of affluent products.

Two Factors Must Be Considered as Essential

We must therefore consider two factors which are essential and which we will divide into two parts: The liberation of heat under proper conditions within unit space, within unit time, its intimacy of mixture used to infiltration, its rate of propagation in combustion, and the nature of the heat itself.

This involves a rather serious proposition. To begin with let us take first in a cursory way the subject of surface combustion which may be divided into:

Coition, Infiltration, Interpregnation, Mechanical Dissociation, Ignition and Conservation.

This may be said to be the synopsis of the very theory of vibration, as referred to heat.

The story of combustion efficiency may be placed in the two words vapor-tension, meaning preferably, a two stage mechanical dissociation of the several elements, a regulation of the temperature so as to enable chemical and physical union between the

several elements and aeration of the fuel, together with the catalytic action of heat and mechanical infiltration to secure the intimacy of mixture.

Concerning the maximum efficiency of gas combustion, the memorandum by G. M. S. Tait should be extremely enlightening and should clarify considerably a great deal of its intricacy.

In the surface combustion furnace the principle is the same as a Welsbach mantle—to burn the mixture in intimate contact with a solid substance, thereby rendering the latter incandescent. In other words, the radiant heat waves are more useful in some industries than either conducted or any other form of heat, and the problem is therefore how to transform the energy of the fuel (gas) into that type of heat exclusively.

Solid Body Acts As Storage Chamber for Radiant Heat

In the first place, you are aware that by increasing the pressure of a blast burner you intensify the flame temperature (due to the fact that you stimulate the activity of the chemical affinity of the combustibles and crowd more B. t. u. into a given flame area). This idea is combined with the scheme of heating a solid body of some volume, so that it acts as a storage chamber for the radiant heat, or rather transforms the sensible of combustion all into radiant heat.

The apparatus is very simple and consists of a porous plate (usually two inches thick) of some temperature resisting material, such as a carborundum polishing wheel with the central hole plugged.

One side of this porous plate is tightly connected with a chamber in which air and gas in theoretical proportions are mixed under a pressure of about two pounds—this being regulated by first turning the pressure on full, and lighting the gas which shoots out in a long flame above the porous plate, then gradually turning down the pressure until the flame is just inside the surface of the porous plate—the plate will then become incandescent (red-hot) and give off all the heat units in the form of radiant heat. The problem is to obtain a porous material that will withstand the great heat developed and, to keep sufficient pressure to prevent the mixture from "lighting back" behind the porous plate.

Only Limitation of Heat Developed is Fusing Point of Porous Body

Recent improvements in the art indicate that it will be possible to design a burner that will operate with air at atmospheric pressure and gas at the standard pressure of 3 in. of water.

Apparently the only limitation as to the heat developed is the fusing point of the porous body employed.

The field is unlimited as to diversity of industrial application —the cooking field alone being immense, but it would appear (without having gone into the subject deeply) that the whole idea is a natural growth rather than an individual invention.

A vital question which is stirring combustion engineers at the present time is that concerning certain supplies of material. The supply of carborundum seems to come very largely from Tripoli, although carborundum brick and tile are being manufactured by electrolytic process at Niagara Falls, N. Y. With regard to magnesite, however, nearly the entire supply of the world is received from Austria-Hungary, which is naturally cut off under present war conditions. There are large stores of this magnesite clay in North Carolina, but it seems inefficient in its results, due probably to a low iron content. This is a siliceous frame work of diatons and an infusitorial earth. The mineral reactions being balanced as to fusion. It is what is known as "dead burned," and, being properly protected, is used as a sub-foundation in furnace work. Possibly less than one per cent of the crystalyne variety of magnesite contains chemically combined iron, but its use is extremely necessary in high temperature combustion work, for instance, the question of steel re-heating requires some 2,500 deg. Fahr., which is beyond the temperature at present handled efficiently in any electric furnace.

It seems that we can reach electrical efficiency of 1,800 deg. Fahr., but at the attainment of the higher temperature the efficiency of the apparatus is extremely questionable.

There is, of course, the question which is a vital one for consideration and one which should be carefully considered and taken through a course of careful experimental work, viz; the time element—this brings us "the facto" readjustment of molecular readjustment. It brings into conditions numerous problems with which we are not as yet acquainted; as, for instance, demagnetism of certain metallic bodies. These matters of molecular readjustment are matters for consideration and investigation, and are not completely understood at the present time, hence the question is a thing for particular investigation in the science of combustion and heat radiance as a catalytic influence.

The temperature of electric furnaces is 2,400 deg. Fahr., but the temperature area is much restricted.

Carborundum a Product of the Electric Furnace

Carborundum is a product of the electric furnace formed at a temperature of 6,000 deg. Fahr. It is derived from two of the most refractory materials known to the metallurgist, being chemically a compound of carbon and silica, and is produced temperature where the most refractory material exists. On account of its superior heat resisting properties, it is coming into extended use in the lining of various types of furnaces where high temperatures are generated, or where various conditions are encountered requiring a special selection of lining materials.

The form of carborundum most commonly employed for refractory uses is known by the trade name Carborundum. Chemically it consists of several silico-carbides of compositions ranging from Si_2C_2O to Si_6C_6O, representing the partial reduction of silica by carbon at the intense heat of the electric furnace. This is furnished in the form of finely ground sand, and is mixed before using with a binding material such as silicate of soda or fire clay to give it proper cohesion when brought up to heat. There is a great variation in the various grades of silicate soda which are sold to the trade, some of them being totally unfit for furnace work, a silicate of soda of 52 deg. Beaume being best adapted for refractory work. This must be diluted with a certain quantity of water before being added to the foresand. When clays are used, a crude Jersey fire clay or one of equal purity is used. Kaolin may also be used with good results. Prepared fire clay, such as is furnished for laying up fire brick, is generally mixed with ground calcined clay or powdered fire brick, and is not suitable for the purpose.

Carborundum withstands a temperature of 2,200 deg. cent., where it commences to dissociate, but at 1,470 deg., cent., its silicon contents commences to oxidize and the material suffers in refractoriness.

Advantages of Surface Combustion

The usual advantages claimed for surface combustion are high temperatures, even distribution of heat, temperature control (both elements being under actual control) and thus affording a neutral reducing or oxidizing element. There is also the possibility of operating in any atmosphere without smothering.

It is, however, questionable whether its field is an unlimited one inasmuch as heat is extremely localized under certain conditions, as, for instance, in the ordinary boiler setting cement kiln or lime work.

To offset this localization of heat it is proposed to run parallel with the tubes of the boiler or the walls of the kiln, a jacket of permeable material with adequate voids, and thus distribute the combustion along the line of heat application. The practicality of such method of heat distribution in a steam boiler is, however, extremely doubtful.

Bone's theory of surface combustion was that all combustion was accellerated by contact with the solid substance. This was contrary to the belief of Siemans and does not hold in the case of a water cooled substance, such as a boiler, for it is a fact especially worthy of note that no efficient combustion under any circumstances ever occurs at a descendant temperature, even if that temperature be above the point of ignition.

It is a paradox that the walls of a furnace may have a tremendous amount more temperature than the original claimed temperature of combustion. This is due to the fact of radiant heat, reverberatory effect, reflection and refraction, and the secondary and tertiary heat waves as well as wave of incident. This combination causes what may be called a conservation of temperature or "a temperature storage" forming a powerful catalytic action in the union of the elements which in turn again is increased by the completeness and high velocity of combustion, and the ability to liberate a vast number of heat units within a limited area.

One of the questions of greatest interest is that of pressure, experiments having run from five pounds to two inches of water (the latter operating with some stack drafts) while boiler work

has usually been done with about eighteen inches of water. It is altogether likely that the furnaces of the future will be down draft or possibly with reversing valves enabling the possibility of removal of carbon and a greater distribution of heat.

HYDRATION OF WATER IN SURFACE COMBUSTION FURNACES

In furnaces of this type the hydration of water has been proved to be most unsatisfactory, although it has been advisable at times in the use of burners with lambient flame.

The Tait experiments show the highest efficiency attained at one and one-half pounds pressure of air and a gas pressure of one pound, the entrance into the mixing chamber being the same size as the gas pipe employed, and the mixing chamber (having the carborundum wall) having a cross section five times larger, or in other words with a one inch pipe supply. The inside diameter of the burner would be five inches.

The temperature developed by such a burner is in excess of 2,800 deg. Fahr., using illuminating gas of 600 B. t. u.

As a matter of fact, pressure may be said to be regulated by two conditions; first, and of primary importance, a pressure of forty, a passage through the orifices of the burner in excess of any possible backward rate of flame propagation—this to prevent back firing. Secondly, the question becomes one of the amount of fuel which it is desired to deliver to the furnace to obtain a given temperature or to perform a certain work.

The construction of the furnaces of this type, are rapidly changing and daily obtaining a wider adaptation, ranging all the way from a domestic gas stove to the carbonization of coal in coal gas and coke oven work. The original furnaces were of the crucible type whereby the retort was surrounded by a body of broken refractory material of such mesh and shape as to be permeable in its nature, and which was brought to incandescence by the admission of an explosive mixture, or rather a mixture for complete combustion entering at high velocity, this material being used as a radiator, reflector, and we may say, ignitor for the incoming charge. It is the opinion of the writer, however, that this method will virtually be obsolete, being superseded by a secondary furnace lining or a series of burners of the radial type such as previously described, the former being preferred; this lining being permeable or perforated in its nature, and completing combustion just within its orifices, as in the case of the burner.

This will give a much more convenient and satisfactory construction, avoid many difficulties heretofore met with, give a more even distribution of heat and unquestionably afford better conditions of refraction and reverberation. It will also permit greater furnace space and capacity and form altogether a more satisfactory piece of construction.

By-Product Gas Ovens Made Possible Economical Extraction of Nitrogen from the Air in Germany

To obtain nitrogen products from air, a source of cheap electric energy is essential. After the war began Germany realized that it would be impossible for her to obtain the nitrogen products which she was making in Norway, in consequence of which she immediately started six plants on the Rhine. Here coal is coked and the distillates are used for making explosives, while the gas produced in the process of coking is used in gas engines, which in turn are coupled to huge generators for making the electricity required for the manufacture of the nitrogen compounds necessary for the explosives out of the nitrogen in the air. At one stroke, therefore, she obtains not only her distillates, such as benzol and toluol, but also the nitric acid which is used for nitrating these products to make the smokeless powder, the nitro-toluol, etc., which constitute the modern sinews of war.

$75,000 Office Building to be Erected for the Grand Rapids Company

A four-story building is to be erected by the Rathbone estate in Grand Rapids, Mich., for use principally by the local gas company which will occupy three floors for its general offices.

Completion of Irrigation Works Causes Falling Off in Business of Boise Company

The gas sales of the Boise Gas Light & Coke Company of Boise, Idaho, showed a falling off of 6.95 per cent for the last fiscal year as compared with the previous one. The city has experienced a general depression, as the result of the completion of irrigation works in its neighborhood, the workers on these developments having moved out of the country. Serious attempts on the part of the citizens of Boise are being made to prevent this depression from becoming permanent.

Sign on Delivery Truck Advertises Gas Ranges

The Clinton, (Mass.) Gas Light Company delivers ranges sold, on a gasoline truck with extension body, and to advertise the ranges displays a large advertising card on either side, reading, "Now is the Time to Order Your Gas Range."

The sign, and the handsome range on its way to be installed, attract attention and lead to further sales.

RANGES ENROUTE TO PURCHASERS ON DELIVERY TRUCK ATTRACT ATTENTION AND LEAD TO OTHER SALES

Gas Companies Under Boston Syndicate Management Show Oil Consumption Record

The following is the record of oil consumption per 1,000 cu. ft. of gas made by nine companies operated by the Gas & Electric Improvement Company, Boston, Mass., the figures showing the gallons of oil consumption for the month of July of this year, and that for the year ended June 30, 1916.

	Month of July.	Year.
Company No. 1	3.68	3.36
" " 2	3.30	3.25
" " 3	3.18	3.14
" " 4	3.01*	3.14
" " 5	2.90†	3.25
" " 6	4.00	3.60
" " 7	3.58	3.76
" " 8	3.25	3.59
" " 9	3.65	3.81

*Gloucester Gas Light Company.
†Leominster Gas Light Company.

The company regards the plants which use less than 3.35 gallons per 1,000 cu. ft. as comparatively efficient, at this season, while those above 3.35 are not.

Sales of Elkhart Company Show Increase

Elkhart Gas & Fuel Company of Elkhart, Ind., showed an increase of 10.39 per cent for the year, as compared with the previous year.

Europe, Despite the Life and Death Struggle Raging Within its Borders, is Making Every Effort to Obtain Highest Efficiency in Production of All Kinds of Commodities

Edward N. Hurley, Chairman of the Federal Trade Commission, Asserts it is a Mistake to Consider Continent Devastated and Disordered—Almost Within Reach of Falling Shells, Europe is Reorganizing Her Industries—Conservatism in Industrial Ideals and Methods Has Been Blasted and Shattered in the Shock of War

Europe is by no means the devastated and disordered continent careless thinkers have pictured her. Almost within reach of falling shells she is reorganizing her industries. Conservatism in industrial ideals and methods have been shattered. Modern methods are taking their place. To prosper after the hostilities have ceased, the United States must keep pace. Next to England we have the greatest foreign trade of any nation in the world. To retain it we must bring our working methods up to the highest possible degree of efficiency. These points were emphasized by Edward N. Hurley, chairman of the Federal Trade Commission, in a recent address before the Ohio Bankers' Association, of which the following is a brief abstract:

Industrial Changes in Europe

When we think of Europe we think of a continent engulfed in war, devastated and disordered, but I want to say to you that we must correct that conception. While in many respects we know little of what is going on in the warring nations, we do know that within sound of the guns, almost within reach of the falling shells, Europe is reorganizing her industries. Under the stress of a life-and-death struggle every effort is being made to obtain the highest efficiency in the production, the distribution and the use of commodities of all kinds.

Conservatism in industrial ideals and methods has been blasted and shattered to pieces in the shock of war, old systems that normally would have hung on for years have been discarded in a day. Old equipment that would have been retained for years has been scrapped as fast as possible for new installations of the most advanced types. New processes are being discovered, new inventions are being made, and new forms of organization are being created.

Industrially, France has been pre-eminently the land of small-scale, highly individualized production, but she now lacks human hands. In France little farms that for generations have been farmed practically by hand or with the aid of a horse or two, are being thrown together and farmed co-operatively by tractors, gang plows and modern agricultural implements.

France must rely on machinery. Her business men are studying and are applying American systems of manufacture in factory construction, in equipment, and in large-scale, highly systematized production.

England the Land of Yesterday

England industrially has been pre-eminently the land of yesterday. Conservatism was the dominant characteristic of British business.

While Massachusetts was making textiles with automatic looms under conditions that permitted one operator to tend from 16 to 24 machines, Lancashire clung to old equipment and conditions under which one operator could tend but 4 machines. But at last England is aroused, and to-day American books on efficiency and scientific management are being bought by the hundred and studied all over England. The war has compelled Great Britain to make thirty years of industrial progress in thirty months.

Before the war Germany was probably the most highly organized and efficient manufacturing nation in the world, but in Germany organization and efficiency have been still further developed, and, no matter whether victorious or defeated, the Germany that emerges from the war will be years ahead of the Germany we knew in 1914.

We Must Keep Pace

These changes are of great concern to us. We may not realize this to-day, because things are coming our way now, but we must look ahead to the future conditions we must prepare to meet. Almost before we know it we will find a new Europe competing against us with war-sharpened brains and war-hardened muscles, not only in our foreign markets but also right here at home.

If our industries are not to be caught slow of mind and flabby of muscle we must improve our business organization, must increase our manufacturing and merchandising efficiency, and must keep pace with every step in Europe's industrial progress.

Next to England we have the greatest foreign trade of any nation in the world. Our exports and imports reach billions of dollars in value. We must keep and expand that great trade. It means the full tide of prosperity for our factories and farms. It means the best comforts and conveniences of modern civilization for the families and homes of this country. But if we are to keep that trade and make it grow as a healthy business should grow, we must have the organization and the facilities needed.

Gas Bill Paid After Twenty-Five Years

W. Greeley Hoyt, president of the Standard Gas Light Company of New York, recently received a letter from Mrs. A. E. Hubbell, of Calgary, Alberta, Canada, in which she made inquiries concerning an old gas bill. Mrs. Hubbell was perplexed, not knowing whether a bill for gas consumed in 1891 had ever been paid.

In her letter Mrs. Hubbell said, "I have just resurrected a bill from the Standard Gas Light Company of New York against Mr. F. F. Sawyer, No. 12 West One Hundred and Twenty-seventh Street, New York, dated March 5, 1891, and March 25, 1891. I found a statement of this indebtedness, but it may have been paid. If anything is owing, or if paid, please let me know."

Mr. Hoyt had the account of Mr. Sawyer looked up in the books of the company's office in West 125th Street. It was disclosed that the two bills read as follows: "March 5, 1891, to March 25, 1891, $1.15; March 25, 1891, to April 29, 1891, $1.23," making a total of $2.38. The bills had never been paid, and no deposit had ever been made by Mr. Sawyer.

Duplicates of the quarter century old bills were sent to Mrs. Hubbell with an explanatory letter. As quickly as the mail could carry the bills and bring back an answer, Mrs. Hubbell forwarded a money order for $2.38, thereby settling an account that had remained unpaid twenty-five years.

Salt Lake City Gas Sales Show Slight Decrease During Past Year

The number of services installed by the Utah Gas & Coke Company increased 1,881 in number during the past year. Three miles of new mains were laid, making an aggregate of 160 miles now operated. The management has been particularly active in developing an increased demand for gas for industrial purposes. A large number of appliances, such as hotel ranges, heating devices for forges and riveting operations, candy boilers and japanning ovens have been installed. A single user in this class of customers has developed a gas demand amounting to 300,000 cubic feet monthly. Gas ranges have been installed in nearly every apartment house in the city. Notwithstanding these efforts, the total gas sales of the company showed a falling off of .95 of one per cent, indicating a reduced individual use of gas, although there was no loss of customers.

Series of Failures Marked History of Dyestuffs Industries in this Country in the Past

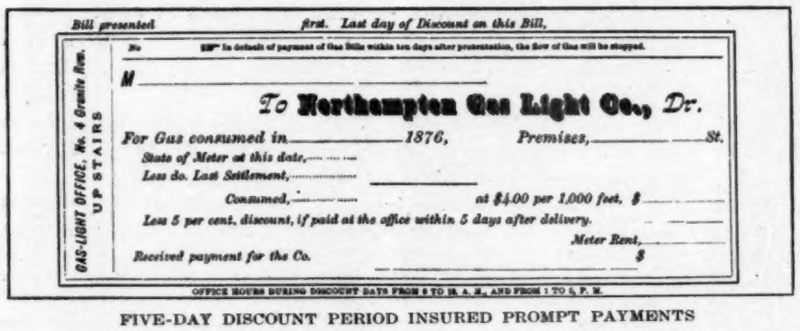
The United States at one time held ten dyestuff factories. In 1883, the duty of fifty cents per pound on dyes was removed, and there was substituted for it an *ad valorem* duty of 30 per cent (which still exists). In spite of this 30 per cent protection, all the dyestuff plants, with three exceptions, perished. These three had a hard time. One of them was started in Buffalo, in 1879, by a very wealthy man. For sixteen years fresh capital was poured into it and not one cent of profit was taken out. Then a small percentage was paid on the money invested, but the company has not realized a yearly yield of 6 per cent on its investment since the commencement of business.

Another company has been in existence since 1882, but has never made money until the war broke out. This company manufactures ultra-marine, the profits from which have enabled it to stay in business.

The third company could not stand the strain of German competition and sold out to a German firm in 1899, since which time it manufactures a few colors and uses its buildings as storehouses.

Forty-Year-Old Gas Bill Discloses High Price of the Time, and Evidence of Prompt Payments

The Northampton (Mass.) Gas Light Company recently dug up a gas bill form of 1876—40 years old—which shows that at that time gas in Northampton was sold at $4.00 per thousand cu. ft., with 5 per cent discount if paid in five days.



Bill presented first. Last day of Discount on this Bill,

No. ☞ In default of payment of Gas Bills within ten days after presentation, the flow of Gas will be stopped.

M

To **Northampton Gas Light Co.,** Dr.

For Gas consumed in 1876, Premises, St.

State of Meter at this date,

Less do. Last Settlement,

Consumed, at $4.00 per 1,000 feet, $

Less 5 per cent. discount, if paid at the office within 5 days after delivery.

Meter Rent,

Received payment for the Co. $

GAS-LIGHT OFFICE, No. 4 Granite Row, UP STAIRS

OFFICE HOURS DURING DISCOUNT DAYS FROM 8 TO 10 A. M., AND FROM 1 TO 5 P. M.

FIVE-DAY DISCOUNT PERIOD INSURED PROMPT PAYMENTS

It is evident that prompt collections were the order of the day, as the bill states that unless it is paid "within ten days after presentation, the flow of gas will be stopped."

Utilities Commission to Determine District of Columbia Gas Rate

The 75-cent gas rate ordered by Congress for the District of Columbia may be increased or lowered by the public utilities commission if that body, after sufficient investigation, determines the rate to be unfair to either the public or the company.

This was made clear by officials of the commission Sept. 1. They stated that the commission will continue its work of valuation of the properties of the gas companies for rate-making purposes.

The provision in the District appropriation bill in regard to gas charges provides that "nothing herein contained shall be construed as limiting or taking away any of the powers now vested by law in the public utilities commission of the District of Columbia.

Expert Advice the Basis Upon which Germany Embarks on All New Projects

Germany possesses a system by which she obtains at all times expert advice from men who have distinguished themselves in their chosen lines of endeavor. These are appointed as privy-councilors, or secret advisors. The Government does not embark upon any new project before it has had the advice of these men, whose opinions are based upon a thorough and scientific investigation of the matter in hand.

Value of Inactive Plant Included in Determining Rates for Richmond, Ind.

Natural Gas has been Constant Menace and Destructive Competitor of Company Since 1899, with Exception of but Few Years—Uncertainty of Supply Makes Necessary that Manufactured Gas Plant be Kept in Readiness

The Public Service Commission of Indiana has stepped in to save a gas utility. It issued an order, effective, Sept. 9, by which the rates for gas consumers (of a plant now being used as a natural gas utility, but having property available for use as an artificial gas plant) were raised to a schedule grading downward from 80 cents gross and 70 cents net for the first 1,000 cu. ft.

The commission's order admitted that the valuation of the company's property, on which rates should be based, should include the value of that part of the company's property now inactive, but available at any time for use to supply customers with artificial gas, in case the natural gas supply—now piped by the Logan Natural Gas Company, from the West Virginia fields—should cease at some future date.

The new rates granted the Richmond Light, Heat & Power Company, which is the utility affected, follow:

	Gross	Discount	Net
First 1,000 cu. ft.	80 cents	10 cents	70 cents
Next 1,000 cu. ft.	70 cents	10 cents	60 cents
Next 1,000 cu. ft.	65 cents	10 cents	55 cents
Next 1,000 cu. ft.	60 cents	10 cents	50 cents
Next 1,000 cu. ft.	50 cents	10 cents	40 cents
Next 5,000 cu. ft.	45 cents	10 cents	35 cents
Over 10,000 cu. ft.	30 cents	no discount	30 cents

Formerly the charge for gas from the company was on a scale, ranging from 40 cents downward. The new rates also provide for a minimum monthly charge of 80 cents gross, subject to 10 cents discount for prompt payment.

The commission fixed the value of the company's property "used and useful for the convenience of the public" under the Indiana law, at $450,000, and in this amount it allowed $35,000 going value and $10,000 for working capital. The state board declared that the company's investors should be allowed to earn 7 per cent, return on the $450,000 of appraised value, and also provided for a 2 per cent, annual depreciation charge.

While declaring that the actual returns from the rates provided were largely problematical, the commission said the following items must be taken care of from the new revenues each year:

Operating expenses	$102,000
Depreciation	9,000
Taxes	8,000
Return on investment	31,500
Total	$150,500

The commission's order, going into the history of the Richmond company at length, showed that for the year ending Dec. 31, 1915, the actual revenues of the company had been but approximately $125,000. This left a deficit of approximately $25,000 in what actually was needed to make the company a solvent proposition, in which investors would place their money. As to the question of the returns the new rates will bring, the commission said:

"An estimate of the earnings of an increased rate can be only a rough approximation. The results can be determined only by an actual trial of the rate as established. . . . The commission finds that the above schedule of rates, tolls and charges is just and reasonable. What the rates will yield is, in a measure, problematical, but we do not believe the earnings of these rates will be equal to the required revenues. However the community is under no obligations to furnish required revenues, if this can be done only by a rate that is unfair to the people."

The Richmond Light, Heat & Power Company originally operated both an electrical and a gas plant at Richmond. Some

months ago, under an order from the public service commission, the City of Richmond was allowed to purchase the electrical part of the utility. Thereupon the officers of the company came before the commission, asking immediate "emergency" relief as to rates for gas at Richmond. They contended that the electrical part of the utility had been holding up the financial problems of the gas company for some years, and that with the passing of the electrical utility into the hands of the city, not only did it establish competition as to lighting, but it took from the gas company the financial support, which kept the company solvent.

The commission, after hearing evidence on the petition, which asked for immediate issuance of an order, increasing rates—pending the final adjustment of the rate question—refused to grant immediate relief, but set down the final cause for trial in July. That hearing was held and the order, issued Sept. 9, and effective on that same date, was the result.

The Richmond Light, Heat & Power Company has been subjected to numerous costly competitive conditions and these are discussed in the commission's order, which goes into the financial history of the company rather completely.

Then the order said:

"The history of this plant shows its unfortunate career is due in part, at least, to conditions over which it had no control. It may have sinned grievously, but its sinning did not produce natural gas. Natural gas has been the millstone about the neck of this utility. It has had losses practically throughout its entire career that have never been compensated by excessive earnings. It is entitled, under any theory of the law, to an allowance for going value. This we have fixed at $35,000. It is also entitled to working capital. Working capital, above material and supplies, is capable of an approximate determination. It ought to be allowed a working capital above material and supplies of about six weeks of its operating expenses for the year. We think $10,000 would be a reasonable allowance for working capital.

"Natural gas has been a continual menace and a destructive competitor of this property from 1899 to this date, except for the years 1910, 1911, 1912 and 1913.

"When natural gas had, as a witness said, again knocked at the city's gates, there was nothing to do but bid it enter. How long it will remain is not capable of definite determination. When it was found in Indiana in abundance our people believed the supply was both constant and unfailing. Its subsequent behaviour defied scientific prognostications. It vanished as it came, literally unheralded and unannounced. The West Virginia supplies being, no doubt, more intelligently husbanded. Yet no man can forecast the time of its duration. Those, who have money invested in a utility ought not to be required to carry the entire hazard of an investment that from time to time may be impaired as science unlocks the storehouse of nature. If this plant had been owned by the municipality the public's investment would have suffered the same distress as has the investment of the private citizens in this utility. If it had been built with the proceeds of the sale of bonds, the bonds would have been there and the city's credit would have been behind them.

"In any event, whether this reasoning be correct or not, we are not disposed to throw all the loss arising from the situation on the investors. The producing plant of the petitioner may be called into active service at any time. We have determined to regard it as a part of the property upon which the company is entitled to a fair return."

The commission took, as the apparent basis for its valuation of the company's property, the figures of its own engineering staff, an approximate total of $411,000, to which sum it added going value and working capital. The company's experts placed valuations on the property, in the rate-making case, of $744,649. G. B. Taylor, an expert employed by the city, who formerly was a part of the commission's staff, fixed the cost of reproduction of the plant, less depreciation, at $338,547.

Gas Advertised in Portuguese Language at Gloucester, Mass.

The Gloucester (Mass.) Gas Light Company is solving the problem of how to reach the foreign element by inserting, in the principal local newspaper, advertisements in the language of a large foreign element which resides there. There are several thousand Portuguese-speaking Azorean people in Gloucester, many of whom work in the fish-curing establishments. The accompanying reproduction shows the "set-up" of an advertisement which is effective in attracting the attention of these people to the uses of gas. It is believed that when foreign-speaking people encounter an advertisement in a newspaper in their native tongue, there is a heart-glow which prompts them to a ready response to the ideas presented.

Podes Ter A Tua Casa Fresca No Vera

USA O FOGAO DE GAS PARA COZINHAR QUE TRAS O COMFORTO A TODA A FAMILA NOS

DIAS DE CALOR

Ferros De Gomar E Agua Quente Encanaca

TUDO FEITO PELA

Gloucester Gas Light Company

ADVERTISEMENTS IN NATIVE LANGUAGE EFFECTIVE IN REACHING FOREIGN ELEMENT

Chester Gas Company Establishes Cyanogen Department

The Philadelphia Suburban Gas & Electric Company, which has about $4,000,000 invested in two large plants in Chester, one of which has just been built at a cost of $1,000,000, is preparing to open new departments that will increase its output nearly seventy per cent.

The Chester concern is engaged in the manufacture of gas, with coke, gas liquor, tar and ammonia as by-products, and within the coming week will be also producing cyanogen.

In another two months the Chester plants of the Suburban Company will be producing 1,825,000 gals. of coal tar per year, and ammonia at the rate of 912,500 lb. per annum. When the cyanogen department is placed in operation, within the next few days, it will be put on a basis of 500 lb. daily.

Both of the Chester plants of the Philadelphia Suburban Gas & Electric Company are on the Delaware River, one at Tilghman street and the other at Highland avenue. The Highland avenue plant is a coke-oven plant, capable of coking 350 tons of coal daily. From this quantity of coal 245 tons of coke are manufactured each day, a total of 89,425 tons each year. Forty by-product coke ovens are in operation at this plant. At the Tilghman street plant both water gas and coal gas can be made.

The coke produced by the Highland avenue plant is used by the Delaware River Steel Company, of Chester, which operates the only blast furnace on the Delaware River.

The coal tar is chiefly used by departments of the Barrett Company in the manufacture of roadmaking and roofing materials. The Chester steel plants also have found this product to be a good fuel. The Highland plant produces about 1,750,000 cu. ft. of gas daily.

At the Tilghman street plant a new coal gas works is being completed and will be able to produce 1,500,000 cu. ft. daily. This plant is only one unit of a plant that ultimately will contain four units. The by-products house at this plant was built to care for all four units.

The unit just completed, together with a bulkhead, a 3,000,000 cu. ft. gas container and other minor improvements, represent an investment slightly in excess of $1,000,000. It is now planned to commence the second unit within a year. The second unit will cost about $250,000.

Albion, Mich., Company Increases Gas Sales 16.47 Per Cent

Albion Gas Light Company, serving Albion, Mich., shows a growth of 16.47 per cent in gas sales, and 20.4 per cent in net earnings for the year.

Continuous Line of Gas Arcs Outshine Neighboring Electric Lights

Show Up Window Fronts to Excellent Advantage—Cost Very Reasonable—Effective in Calling Attention of Public to Store and Its Goods

A continuous line of gas arc lamps on the fronts of three stores in the Roxbury district of Boston, Mass., creates what is locally known as the "Gas White Way," which rivals in brilliant sidewalk and street illumination any installation in the city.

GAS WHITE WAY, THOUGH PRIVATE UNDERTAKING, RIVALS IN SIDEWALK AND STREET ILLUMINATION ANY INSTALLATION IN CITY

There are in all about 160 five-mantle Humphrey lamps adorning the fronts of Ferdinand's Blue Store, Timothy Smith & Company's department store, and the Lawrence Clothing Company. They are installed over the sidewalk, those on Washington Street being under the overhead structure of the Boston Elevated Railway. The gas arcs put the electric street lights entirely "in the shade," and make the window fronts better lighted, indeed, than in the daytime.

A letter to the Boston Consolidated Gas Company from Frank Ferdinand & Company, who have 30 of the arcs installed on their store front, says that the lamps have fully come up to the guarantee. The firm has kept a very careful record of hours of burning, and finds that the consumption of gas is "well inside 1.5 cents per hour." They give a splendid illumination, the firm says, and show goods in the windows very clearly, even when the store lights inside are not burning. Besides, they make a very fine street illumination, calling public attention to the store and its goods.

Slight Blaze in New Bedford Plant

An oil pipe which burst, in the water gas department of the New Bedford Gas & Edison Light Company, caused a small fire by the escaping oil becoming ignited by hot coals which had just been drawn. The fire was partially extinguished by employees with their own fire-hose. Damage was caused to woodwork around the windows, amounting to only about $50. Gas manufacture was resumed at once.

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Can Pavement Over Street Openings be Properly Restored?

Elsewhere in this issue we publish a letter from C. N. Green, engineer of subsurface structures for the Public Service Commission, First District, New York, in which he takes exception to our criticism of New York City's methods in regard to the restoration of pavements over street openings, which was published on page 56 of the July 24 issue of this journal. While we regret our error in quoting Mr. Green as saying that it is impossible, instead of it is *almost* impossible—as he really stated—to properly backfill these openings, his letter does not in any way change our viewpoint. We do not think it is even *almost* impossible to backfill such openings properly, and consider that the method of doing so that was outlined in our previous editorial, is in every way practical—even in Manhattan. This method, by the way, is not one that was originated in this office, but one that has been in use by main-laying contractors for several years, and experience has proved its value. In streets so narrow that a passageway could not be left alongside, it would of course be impossible to use, unless the street was blocked off entirely, but there is a greater mileage of streets in Manhattan where it would be adaptable than there is of the narrower class.

Mr. Green states that the caring for the openings while settling would tax almost any organization. We cannot agree with him in this statement either. It would not be necessary to attend to every opening, after settlement set in, at very frequent intervals, and certain asphalt companies have for years managed to maintain streets over wide areas for many years past without any great extention of effort.

Mr. Green gives as a proof of his arguments that the present condition of New York City's streets is the best evidence of the impossibility of restoring pavements to their original condition. This seems to us rather a proof of the statement made by this journal, namely that the methods employed at present are wrong, and should be changed.

Surface Combustion

"The past few years have brought such rapid advances in the perfection of cooking and heating appliances that our distribution systems are beginning to groan under the load, having been designed to provide amply for illumination only. The downward trend of rates, such as Seattle has experienced, has done much to popularize the use of electric current for all purposes, and the central station man is becoming more and more concerned about the return from this class of business. Hence, we have prepared herewith a preliminary analysis of the ultimate conditions in five, ten or twenty years, when every house will be electrically equipped with light, cooking, heat and water heating, and have designed such a distribution system as would be required, keeping in mind the commercial aspects of the situation."

There is probably no organization in the electrical field that is more conservative than the American Institute of Electrical Engineers. This makes the above quotation, taken from a paper by Carl H. Hoge and Edgar Perry, which appeared in the August Proceedings, and which is to be presented at the Pacific Coast Convention in Seattle in September, all the more significant.

It will be noted that the paragraph quoted states that electric cooking is not a prospective business, but that it already exists to such an extent as to make the electric distribution for this class of consumer a serious problem. It also allows only from five to twenty years for electric cooking to become universal. The remainder of the paper goes on to elaborate an effective method of distributing the current to take care of the new load.

This being the case, it is apparent that the gas man must seriously take up the matter of keen competition in the domestic and industrial heating fields. The electric light companies now see a way in which their residence loads can be made much more profitable than they are at present. They are doing a great deal of investigating, and studying on the subject. Unless the gas man

uses a great deal of energy in preparing to meet this competition, which in a few years is sure to become very keen, he will be placed at a very great disadvantage.

One method of preparation is the perfecting and the popularizing of the most efficient and economical means of using gas. There are at present but a very few people who know very much about the surface combustion method, for instance. It is safe to say that outside of scientific circles and the gas industry there are practically no people who know anything about it. In the gas industry there are comparatively few people who have actually seen surface combustion burners in practical operation. There are not many more who have read much about it. At the present time there is a considerable dearth of literature on this very important development in the gas industry. It, therefore, would seem wise that more publicity be given to this method of burning gas, and that all the encouragement possible be given to the investigators who are endeavoring to improve it and make it a greater commercial success.

Compensating Salesmen

Gas companies are not the only interests that find the proper compensation of salesmen a puzzling question. In a recent issue of *Printers' Ink* there is an article dealing with the compensation of salesmen in department stores. In this article it is pointed out that there are extremes in this field. There are department store managers in New York who believe that salesmen should be paid nothing but a flat salary while there are others who hold that the only proper method of payment is on the commission basis.

In this article there is one method of paying salesmen that should prove of special interest to gas companies using the commission method. This is the method used at the R. H. Macy store where, in order to establish a commission system that would permit of a final settlement with each salesman at the end of each month, the following procedure is followed:

The sales for each month of the year for a period of five years were ascertained. It was then found what percentage would have to be paid each month to make the average per salesperson the same as on the former salary basis. This was the commission percentage finally adopted. The rate of the commission changes each month, but the total monthly commission paid remains fairly uniform throughout the year. In this way final settlements can be made each month. It is not necessary to allow any salesperson to overdraw the drawing account. It is not necessary to carry an overdrawn account along for several months, or to make a final settlement only once a year.

In the gas business nearly every gas company has individual salesmen or even departments that spend their time selling service that is more or less seasonable in nature. The gas lighting service is an example. The problem of adopting a satisfactory commission basis for these men is a serious one. It would seem that some such system as the one used in the Macy store would prove very much more satisfactory than a flat rate resulting in very high monthly remunerations in the winter months, and very low monthly remunerations in the summer months.

In the electric business we also find much interest displayed in the method of paying salesmen. In the August issue of *Electrical Merchandising* there is an article by George Williams in which he explains how the Doherty Company has made a great success of a system of combined salary and commission. In this system each salesmen is paid a salary of $50.00 per month for doing work on which it is very difficult, if not impossible, to figure commissions. In addition to this salary each salesman is paid a commission on all sales. These sales, however, he must make at a price that results in a real, rather than an imaginary, profit to the company. There are also commissions or bonuses figured on a quota basis for the new business managers. Since this system was adopted the sales have greatly increased, the deficit chargeable to new business has been wiped out, and replaced by a profit, and the merchandising department of the company put upon the same business basis that the merchandising department of dealers have to be operated on. The system of paying salesmen is given a great deal of credit for the very gratifying results which have been secured.

Need of Highest Efficiency in Manufacturing to Compete with Europe after the War

Though it may seem remote from our field, we publish elsewhere in this issue a brief abstract from a recent address by Edward N. Hurley, chairman of the Federal Trade Commission. Mr. Hurley points out the decided modernization of European methods, which are being brought about through the war, and emphasizes the need of this country's keeping the same or a greater distance in advance, that has been its one advantage in the past. This modernization in European methods spells, to a very large extent, the word gas, in all that it implies. Mr. Hurley does not state this fact, but European publications have been alluding to it with convincing reiteration for many months past. Gas—with its by-products so useful to English munitions manufacture—gas, which has been the means of relieving German anxiety over the nitrogen supply, and has taken the place of petroleum in its industries, has come into its own in Europe. To a certain extent, it has done likewise in this country, but not to the extent that it should have.

No effort should be spared by the gas man in pressing home the great economic value of his product to his country. It is a patriotic duty that transcends in importance even his duty to his stockholders.

Selling Price

Fifteen years ago there were many people who were quite sure that the automobile business would never become a big industry. They were certain there would never be any danger of the automobile supplanting the horse on our city streets. At that time the securities of automobile companies were not in such demand as they are to-day. The machines turned out were sold at high prices and gave a great deal more trouble than does the modern machine.

To-day we see on the streets of many of our large cities nearly as many automobiles of one make as we do horses. A horse, especially for pleasure purposes, is already becoming the exception. There is at least one manufacturer who is turning out over a thousand cars a day. There is no stock farm that advertises a daily average shipment of a thousand horses. The price of these machines is in many cases no higher than the price of a first-class horse. The result of this development has been that now nearly everyone either owns an automobile or is planning to buy one.

During these past fifteen years there has been just this essential difference between the horse business and the automobile business. The horse business has been conducted along the same lines that it has been conducted for the past centuries. No determined effort has been made to make the horse more popular. The higher price of the automobile has been looked upon as a sufficient protection of the horse-breeding industry. The automobile manufacturers on the other hand have adopted very intensive selling methods. They have advertised liberally and have organized very efficient selling forces. They have built up a demand that has made quantity production possible. This quantity production has made it feasible to lower the selling prices. The lower selling prices have made it possible for the salesmen to again greatly increase the demand. Price alone, however, has apparently had little effect on either industry. The one that has used the best selling methods has won out.

Many gas men are now resting secure on the mistaken idea that electric companies will never be able to sell much domestic and industrial heat because the first cost of the appliances is so high, and so few electric light companies have a low enough rate to make the use of electricity for heating purposes attractive. There is a great danger in relying upon price alone either to prevent the sale of, or to sell, an article. Price alone seems to have very little effect upon the sale of anything. What actually does count is the energy, intelligence and enthusiasm put into the selling effort. The persistence displayed in educating the public in regard to the great advantages of an article or service may not only create a great demand, but also may make it possible to actually reduce the selling price until it sells for less than any competing article or service.

Correspondence

Proper Backfill Over Street Openings

SIR: In your issue of July 24th I note that you have commented editorially on my report of June 10th, 1915, to Mr. Alfred Craven, chief engineer of the Public Service Commission, in the matter of underground congestion. You have made me say that "It is impossible to properly backfill street openings made by gas companies in laying new mains and installing services or for repairs to either." What I did say is that—"it is *almost* impossible to properly backfill these openings and it *is* impossible to restore the pavement to its original condition." I cannot believe that your Journal is prepared to maintain differently.

This report was written for conditions in Manhattan, and while in some cases it may be possible to backfill properly, the fact remains that in the majority of cases it is not done, and the present condition of much of the street paving is the proof I submit. Your suggestions for a good job of backfilling might reasonably apply in other boroughs than Manhattan, but with the congestion of traffic and the number of openings to be restored, there is every incentive to make a rush job and get the street closed up as soon as possible. With upward of two thousand openings per month it would be impossible to keep traffic away from the openings long enough to carry out your suggestions, and it also might be a difficult matter to find storage places for the surplus material. Your procedure would leave not less than six thousand openings in the streets of Manhattan at any given time, over which the paving has not been restored. The supervision and force necessary to care for these temporary fillings would tax almost any organization. Naturally most of these openings would be in the congested downtown district where a contraction of the width of the already narrow streets would turn them into one-way streets or tie up traffic endeavoring to pass in both directions.

CHARLES N. GREEN,
Engineer of Subsurface Structures,
Public Service Commission, First District, New York.

For cities with wide streets and in the wider avenues of Manhattan where the openings do not run into the thousands, the method recommended by you might be practical.

Nearly All Dyestuffs of Commercial Importance Invented by Germans

Nearly all dyestuffs of commercial importance were invented by Germans. The patent concession gave them a monopoly upon their inventions for fourteen years. The prices permitted to be charged for these patented dyes were so arranged that during the life of the patent the profits realized would repay the price paid for the original plant. At the expiration of a patent a plant costing at times as much as one million dollars would then be placed on the books as valued at one mark. Auramine, a yellow dyestuff of great beauty and strength, sold at an average price of $1.48 during the life of the patent. When the patent expired, the price in the United States became forty-eight cents, and any one who cared to manufacture it was free to do so. Did any one in the United States take it up? No, decidedly not. The American manufacturer would have been compelled to build a plant costing perhaps a million dollars. This would have meant an overhead expense on the plant of one hundred thousand dollars. The manufacturer would have been further handicapped by his lack of experience (which the German firm gathered in working the process fourteen years) and the chances are that it would take him several years before he would have been able to get the same great yields, or equally good ones, as compared with the German. The price of forty-eight cents was fixed upon by the Germans because they knew that there was no chance at this figure for the American to compete successfully in the manufacture of the product.

—*Lancet-Clinic.*

Publications

THE ASSOCIATION OF AMERICAN GAS INDUSTRIES—CONSTITUTION AND BY-LAWS: 9 pages; cloth bound. Sets forth purpose and objects of association, which was organized in 1915, and gives names of officers and members. Among its objects are the establishment of reasonable, equitable and uniform contract conditions between its members and the corporations that purchase their products and to increase the value of the service rendered by its members. Membership is restricted to firms and corporations engaged as principals in the manufacture or construction, or both, of gas works equipment. The annual meetings will be held in New York City, during the third week of February of each year, at such time and place as may be selected by the secretary. John S. De Hart, Jr., president of the Isbell-Porter Company, of Newark, N. J., is president of the association and Eugene Y. Sayer, vice-president and general manager of the Improved Equipment Company of 60 Wall St., New York City, is secretary and treasurer.

THE HUNTINGTON LIGHT & FUEL COMPANY: 28-page booklet; stiff paper covers, illustrated. Gives intimate history of the company and of its founder, George J. Bippus, and describes its present condition. Illustrations show buildings, offices and plant. An especially notable feature is the attractiveness of interiors and offices. The displays in the new business department, it would seem, would make anyone want to use gas for heating or lighting.

CHEMICAL PRODUCTS: 16-page booklet, issued by the Du Pont Chemical Works, Equitable Building, New York City; discussing various products of the class indicated, including the company's amyl acetate, iso amyl acetate, refined fusel oil, ethyl acetate, star solvent, waterproof cements, mantle dips, household cement, pure benzol, etc. In regard to the mantle dips, the booklet states: "These are pyroxylin solutions used for depositing a protective film on incandescent gas mantles, to prevent the delicate thorium oxide from fracturing while the mantles are enroute between the factory and consumer. Our formulaes have been developed after years of careful study of the requirements of the gas mantle business on the part of our chemists, and are giving excellent satisfaction in many factories in different parts of the country. In addition to our ready-to-use-dips, we are in position to furnish base solutions for those concerns who prefer to make up their own dips. In these base solutions we use a special grade of pyroxylin which our long experience with the mantle business has shown to be best adapted to meet the requirements of this industry."

LIGHTING APPLIANCES—SPECIAL LIST FOR GAS COMPANIES—Catalog and price list of Welsbach Company, Gloucester, N. J.; 40 pages, illustrated. A splendidly prepared booklet, and an effective reminder of the great progress that has been made in the way of attractive gas lighting fixtures. Especially interesting is the description of Welsbach Kinetic Gas Bowls in which are both gas mantle burners and electric sockets, either ready for use as desired.

ZULITE: 4-page folder describing a special black coating for iron and steel, woodwork and roofs, issued by the Bayway Chemical Company, 235 Bayway, Elizabeth, N. J. The title is the company's trademarked name for the preservative and protective paint commonly known as asphaltum. Among the merits claimed for it are that it resists heat and acid vapors, and that it is anti-corrosive. A special grade, known as Tropical Zulite, is designed particularly for use in warn climates, and, it is said, holds fast to galvanized iron without peeling and resists the tropical sun.

HOW TO CONSERVE SULPHURIC ACID—A PRACTICAL SUBSTITUTE: Folder issued by E. I. du Pont de Nemours & Company, describing Nitre Cake, of Wilmington, Del., which is used for removing oxide and scale from sheet and tin plate, pressed steel and as an acid wash, etc.

Any Legislation that Strikes a Blow at the Value of Gas Plant Residuals is a Blow Against Adequate Preparedness

W. H. Gartley Calls Attention to Injury that Would Be Done Gas Industry Should Government Nitrogen Plant be Established Along Lines Now Contemplated

Few realized how important the carbonization of bituminous coal, and the manufacture of water gas, become in any scheme of preparedness or in actual war, states W. H. Gartley in the September number of *Gas Institute News*. Each warring nation has its own formulae for high explosives, but one and all depend on the by-products of gas manufacture for their raw material. The T. N. T., picric acid, trinitro-benzol, trinitro-naphthalene, the ammonia base explosives are all made from our tars and condensates. The one great agent, common to all the generally used explosives, nitric acid, can be made quicker, more simply and requiring less expensive plant when made from ammonia than by any other method.

Legislation Affecting Adversely Profit in By-Products of Gas Manufacture a Blow to National Preparedness

Any congressional legislation now pending, passed or to come that will strike a blow at the value of gas plant residuals is a blow against adequate preparedness. The gas works managers have been slow to interest themselves regarding the final disposal of materials made from their by-products. The quantity produced, at any individual plant, of by-products convertible into dyes, munitions, etc., is small, and much specialized work and processes intervene between the by-product and the salable high grade final merchandise; in the larger plants the relation between the company and the commissions discourages development in these directions. But should we not keep in mind the fact that whoever it is that works up our by-products any of his troubles tending to depreciate the value of his output and restrict his sales are, in the ultimate, our troubles also?

If Congress passes a law authorizing the expenditure of some $15,000,000 for the erection of a plant to make nitric acid for war munitions in time of war and in peace time to convert that nitrogen into enough fertilizer to supply the whole country, it would have the effect of destroying absolutely our return for ammonia.

World's Supply of Nitric Acid

Early in 1914 the world's supply of nitric acid was made almost entirely from the nitrate of soda deposits in Chile. There was some fixation of the nitrogen of the air in Norway and to a lesser extent in Germany, but the conversion of ammonia into nitric acid by passing a mixture of NH_3 and air over hot catalytic agent had not been used except in a very small way. This process is patented by Professor Ostwald of Saxony, the United States patent being issued in 1907. Others using different catalyzers have taken out patents since.

The result of this process was of enormous importance to Germany. Having in stock some 650,000 tons of nitrate of soda in July, 1914, in Germany, she captured about 200,000 tons more in Antwerp, all of which was expended in the first six months of the war. Cut off from further supplies she developed and made extended use of the Ostwald process for the manufacture of nitric acid as the final step of the cyanamid process and for the conversion of ammonia into nitric acid. Germany is said to have spent over $100,000,000 since the beginning of the war on these plants, and even England with sea routes open has heavily invested in these processes, erecting plants in all allies' territory.

Germany, therefore, entirely cut off from the procuring of what was believed in 1914 to be the only supply for making nitric acid on a large scale, and facing humiliating defeat in the war, for no war can be fought without nitric acid, has helped herself and procured some 800,000 tons of nitric acid in 1916 by developing a hitherto neglected and untried process of one of her subjects.

Nitric acid is now made in Europe from the nitrate of soda obtained from the great Chilean deposits, from the union of nitrogen and oxygen of the air in the electric arc process, from the Haber or the cyanamid process, and by the simple conversion of pure ammonia gas obtained in coal gas plants and coke ovens into NO_3 by the Ostwald processor.

A proposal has been made by producer gas engineers to recover 25 lb. of ammonia per ton of gas coal in producers, and use the producer gas for power to make more NO_3 by either the cyanamid or arc processes. A low cost of power installation is secured and this general process is in wide use in Germany and England, particularly the latter.

Favored Process a Menace to Gas By-Products

The cyanamid process of the American Cyanamid Company at Niagara Falls now appears to be in favor in Washington. Mr. Washburn, the company's president, states they intend, if the Government accepts their proposition, to make the equivalent of 2,000,000 tons per annum of standard fertilizer in peace time or 90,000 tons of nitric acid yearly during the war.

For more than 20 years the selling price of sulphate of ammonia has stood with little change at approximately $60 per net ton, although in the early months of 1914 it had declined to as low as $52. This was unmistakable evidence that the supply had exceeded the demand. If the propaganda after years of hard work of the Barrett Manufacturing Company and others looking to an expansion in the use of fertilizer by our farmers and planters, and more particularly to the extended use of fertilizer containing sulphate of ammonia, could not keep up the selling price of our by-product, what are we to expect when 2,000,000 additional tons of domestic fertilizer are offered to the market? The claim that Germany by using seven times as much fertilizer raised four times as much grain per acre is not new or conclusive to the Wisconsin agriculturalist.

The avowed purpose of the president of the American Cyanamid Company is to produce a large quantity of cheap fertilizer, and his proposition to the Congressional Committee is for the Government to develop 100,000 primary electric horse-power or an installation of 125,000 continuous horse-power on the switchboard at an estimated cost to the Government of $13,000,000; to erect under private capital a cyanamid plant for making fertilizer paying the Government 3 per cent on its investment for water power development; the Government to expend $5,000,000 for a plant, idle during peace, exclusive of the fertilizer plant, for the manufacture of 90,000 tons of nitric acid yearly and to have on the ground buildings and material by which an additional 90,000 tons can be made.

This proposition means that the Congress shall hand over to the American Cyanamid Company 125,000 hydro-electric power, not procurable except by act of Congress, in order that that company shall during peace times make at low cost all the fertilizer the country will use. On its face this is a business proposition to stand on its merits. It gives the country a supply of nitric acid in time of war and a Governmental protected monopoly of the fertilizer business in time of peace.

This plant will when completed make a maximum of 180,000 tons of nitric acid yearly for the Government in war times and at such times the manufacture of fertilizer will cease, since it is not conceivable that the hydro-electric installation by the Government will be in excess of that required to make all the nitric acid the plant can turn out in war time.

What advantage is there for the Government in this proposition when the supply of ammonia from coal distillation in coking ovens and gas works will in 1917 yield over 500,000 tons of nitric acid? The greater the demand for gas works ammonia the greater the production of benzol, toluol and other explosive bases. The greater the production of fertilizer by the cyanamid process the lesser the production of these absolutely necessary bases for explosives.

Considerations of Gas Output and of Residuals, as Well as of Labor Costs, are Conspiring to Impose Full-Vertical on Chamber Retort on Gas Industry in England

Cost of Gas Oil Likely to Cause Whole Matter of Carburetted Water Gas Manufacture to be Reconsidered—Regime of Horizontal, Partially-Filled Retort is Passing

The war has wrought many changes in most industries in Europe. The gas industry has possibly been the most affected. The effects of the war bid fair to cause even greater changes from methods hitherto employed, or brought into use to meet a tempo-rary need. The question of "after the war—what?" has become one of great moment. The following expression of opinion, taken from the *Gas World*, should therefore prove of interest to the American gas man.

Answer Can Be Only in Non-Committal Formula, "It Depends."

It is becoming increasingly evident, amongst the many signs of the times which are being so anxiously scanned on all hands, that considerable changes are to be expected in the conduct of the British gas industry. The newspapers, with their customary trick of exploiting the obvious, are bestowing some casual attention upon the question of the probability of the continuance, under peace conditions, of the extraction of spirit from gas at present demanded by the Ministry of Munitions.

The answer, of course, can only be in the non-committal formula, "It depends."

This question, however, is only one of several which confront the gas manager who would fain see as clearly, and as far into the future, as behooves the custodian of such important interests as those appertaining to and depending from the gas industry.

Let us, very tentatively, attempt to focus the more easily distinguishable of these problems, as they show in the half-light of the present.

There is, first, the eternal question of labor. According to the advance notices of the programme of the Trades Union Congress, to be held in Birmingham, during the first week of September, the organization represented will demand that all trade union rules and customs, rights and privileges, existing or asserted before the war, shall be maintained afterwards, with advantages.

We have no intention of cataloguing, still less of discussing, the claims in question, with which our readers are sufficiently familiar, beyond remarking that the good folks who fondly imagine, from what they have been told by politicians and others, that one good effect of the war has been to make once-antagonistic capital and labor "lie down together" are sadly misled.

None know the facts better than gas managers, who are not likely to be blinded as to the future by phrases coined in order to make it appear on the surface that "all is for the best in the best of all possible (industrial) worlds."

Matter of Carburetted Water Gas Manufacture may be Reconsidered

With regard to narrower technical issues, the question of gas oil is likely to cause the whole matter of carburetted water gas manufacture in England to be reconsidered.

Values will be taken account of just as when the economical aspects, first of the substitution of this means of enrichment in the place of cannel, and, secondly, of the adoption of this method of relieving or reinforcing the bulk production were in the balance. The course of events in this regard will be governed by the oil market, which will be eased somewhat by considerations of the reduced quantity of oil required to make the town's gas of the future, and of the higher cost of carbonizing labor by every system.

In coal carbonizing the *régime* of the horizontal, partially-filled retort is passing. Few gas managers having carbonizing plant to remodel or extend will be able to afford to repeat the old fashion, or to abide in the half-way house of the "slopers." The burden of proof of advantage lies upon such.

Considerations of gas output, and not less of residuals as well as of labor costs, are conspiring to impose the full vertical or chamber retort upon the industry.

The scales are tilting all one way. Of course, it is not for us to particularize with regard to systems, and it is open to everyone to choose the style that appeals most convincingly to general requirements and local conditions. Some of these will be of a permanent character, while others will change with the chances of a novel future. Of course the pressure of having to meet and provide for new developments will be vastly greater in some—the minority, perhaps—of the British gas undertakings than in all.

It is sometimes forgotten that many gas-supply areas in the country change hardly at all from generation to generation. Even here the opportunity and the call for conformity to a type originating with works more in the movement arises occasionally, while it would be well if the biggest undertakings were always the most progressive.

Better Cost Accounting Essential to Efficiency

Among the essentials of efficiency in any business, correct and adequate knowledge of that business is the first. That is the foundation, and the corner stone of a knowledge of business is the knowledge of costs. But the unfortunate fact is that a large proportion of the business men of the country do not know their costs accurately. Most of the big companies have good cost systems, but thousands of the smaller concerns have neither adequate or accurate cost accounting.

Another still more serious feature of the situation is the fact that out of the 60,000 corporations that report an annual income of $5,000 or over, half do not charge off a single penny for depreciation. Obviously their cost systems are neither adequate or reliable. They even go on paying taxes to the Government on inflated values and inflated earnings. But no business knows its true condition till it has made allowance for depreciation, and no cost of production is a true cost which does not include depreciation of plant and equipment.—*Extract from a recent address of Edward N. Hurley.*

Gas From Earth

There is certainly no dearth in the number of natural products from which gas can be extracted, and when consideration is given to the multitude of raw materials, such as wood, peat, manure, etc., which have at some time or other been called into use for the purpose, it might almost be wondered why the gas engineer should regard his coal stocks with a watchfulness bordering on affection.

The latest recruit to the already diverse list of gas-making substances is a form of brick-earth which, in the neighborhood of Fletton, has been found, when distilled at a dull red heat, to yield about 500 cu. ft. of gas per ton, with about 6 gal. of crude oil and 25 gal. of ammoniacal liquor. The substance from which the gas is obtained is known as Oxford clay, which has been found to contain a quantity of bituminous matter, and evidently resembles, although of a poorer nature, the well-known Kimmeridge variety. The results of experiments seem to indicate that by the utilization of the gas some considerable economy may be effected in brick-making, not only by employing the gas as a substitute for steam power or producer gas, but also by firing the kilns with gas instead of the small coal now generally used. It is stated that a refined oil may be obtained from the crude tar formed in the first place, while the ammonia is recoverable in the usual way.—*Engineering Supplement of the London Times.*

Technical Writing An Aid in Overcoming Temptation to Let-Up in Effort When Mere Routine is Mastered

Majority of Men Stop Doing Original Thinking between Ages of Sixteen and Thirty—The Brain Like the Muscles Needs Exercise to Keep it Active—Writing a Valuable Training

By J. E. BULLARD

For many years the writer has been engaged in the training of salesmen. Some of these men are continually learning new things, and are constantly advancing. The rate of advancement of men under helpful training in some cases has been almost beyond belief. Most of them, however, learn only enough to do their work in a routine way, and get results just good enough to enable them to hold their jobs. His experience has been such as to lead him to believe that the majority of men stop doing any original thinking sometime between the ages of 16 and 30. The longer they live the more apparent it becomes that there is something in their brain that has withered up and died, just as one's arm would wither up and die if it was not used for any purpose or any of its muscles exercised for a period of fifteen or twenty years.

The brain like the muscles needs exercise to keep it in healthy working order.

Vast Majority of Men Engaged in Routine Work

The vast majority of men are engaged in work that is largely routine in nature. There is a great temptation to master the routine; do the work and think no more about the business.

In these days of specialization this temptation is greater than ever before. We find college men who, after they have been out of college for ten or fifteen years, do not appear to be as well educated as they were the day they left the walls of their Alma Mater. These men are victims of the routine habit.

As has been stated there is a very great temptation to think no more about the business after the routine has been mastered.

In fact many men are in positions where they see no advantage in doing any thinking. They do not consider they are paid to do so.

All that is expected of them is to do the routine work. These men are making a very grave mistake. The constructive work they can do may be of some value to their companies, but it will be vastly more valuable to themselves.

A man may ask: "How can I go about increasing my knowledge and efficiency?" The answer, of course, is. Study! The man may reply that he has not studied for so long a time that he finds it very hard to concentrate his mind on new subjects, and to master them. If these men will combine writing with study they will find it very much easier and very much quicker to learn.

Possibly the two greatest examples of self-made men this country has ever produced, at least self-made men who have become truly great, are Benjamin Franklin and Abraham Lincoln. A study of the life of either will clearly show how much their education depended upon their practice of writing.

A gas man will sometimes say that his fellow employees will ridicule him if he writes. They will call him crazy or vain if his material is published. The man who cannot stand jesting and ridicule will never make a great success. Had Henry Ford given up when the people of Detroit looked upon him as a fool or a lunatic for spending all the money he could raise in experimenting with a "horseless carriage" that all his ridiculers could easily see would never work, he would never have been able to endow his recent peace movement, or attain the publicity he has attained through his welfare work among his employees.

There are certain people who will always ridicule any signs of progress. That part of their brain that functions on the progress idea has never been used enough to prevent its withering up and dying. Do not be afraid of these people. They will do you no harm. Their barks are far more dreadful than their bites.

Companies Opposed to Writing Employees

There are men so situated that they think they cannot write because they imagine that their companies are opposed to all kinds of publicity. To these men the first advice is. Go to your immediate superior with something you have written and ask him to read it over and criticise it.

In most cases this executive will be broad minded enough to realize that the man who is thinking about the business is a better man than the merely routine man, and will help and encourage him. There may be cases where the executives are actually opposed to their men progressing.

My advice to men so situated is for them to first make sure that the company does not want them to do constructive thinking, and then to look for a new position with a more liberal minded company just as soon as they can.

A man in the gas industry has a wonderful opportunity. The field is liberally supplied with trade journals, and the editors of each can be made to serve as a teacher both of English and of logical, constructive thinking.

It is deplorable that gas men do not take greater advantage of this valuable service. I have never found a gas journal editor who has anywhere near enough of this work to do. I do not know an editor in the industry who would not be very glad to do a great deal more of it than he is doing.

I do not think that it is possible to make any industry progress as fast as it is possible for it to progress unless a considerable percentage of the men in that industry contribute their new ideas to the papers devoted to the welfare of that industry.

I have heard gas men severely criticise their gas journals. These men are, almost always, men who have never contributed anything to the journals. They are, therefore, themselves to blame if the journals do not publish articles that are up to the standard they would like to read. Considering their support in the way of contributors, I believe that the journals devoted to the interests of the gas business are much above the standard of the journals in other industries.

Constructive Criticism

We should never spend our time criticising until we try to help. I would not attempt to write this article if during the past four years I had not done my share towards the support of gas journals. The object of writing it is to encourage others, especially the young men of the industry, to do likewise.

If you are a young man and have never written anything, just begin thinking of something about which you believe you have some new or original ideas or which you have done in a new or original way. If you are at all ambitious there is something you know about that comes under these headings.

Write an article about them. Go over this article until you have made it as good as you can possibly make it, and then send it to the editor of your gas journal.

When it is printed under your name, that is, supposing that it is good enough to print, the thrill you will feel will be worth all the effort. After this thrill has partially worn off you will also probably receive a check in payment for the article which will seem more valuable to you than any other money you have ever earned.

Somehow there is a greater satisfaction in being paid for the privilege of printing your ideas than there is in receiving money for most anything else. Don't take my word for this. Try it and learn for yourself.

Summarizing, we find the following six good reasons for contributing to the press of the gas industry.

It is a method of learning by doing, open to everyone, regardless of age, sex, position or salary.

It keeps the brain active and in good working condition to do real constructive thinking.

The greatest self-made men America has ever produced owed their success in a considerable degree to the habits they formed early in life of writing out their ideas.

The gas journals teach the contributors even more than they do the readers. They teach the contributors how to write, and how to think logically and constructively.

The greatest progress in any industry depends upon a goodly percentage of those employed in that industry contributing their ideas to the press of the industry.

The beginner finds a great satisfaction in seeing his work in print for the first time, and in realizing that it will be read by thousands of readers.

Strong Regulatory Body Only Solution of Public Utility Proposition

Personally, I do not see any other possible solution of the public-utility proposition than the creation of a strong regulatory body. In saying this, I know that I am talking to an audience that does not agree with me. But to my mind, the more centralized these regulatory bodies are in the state, the greater resources they have, the greater their ability to employ expert talent, the better it will be for the public utilities, large and small; and I am talking from the point of view of a man who operates utilities as small as any represented in this room and as large as any represented in this room.

If there is anything wrong with my business, I want to know it, and the best way for me to know it is to have a public official who has the right to look into my affairs in a position that he can employ the highest class of talent to help him come to a conclusion as to the right and wrong of the business he is passing judgment on. So that, from my point of view, I know of no better arrangement than a centralized regulating body covering the whole state.

This view is not popular, I know, not only in the state of Iowa, but to a large extent in the neighboring state in which my operations are mainly confined. It is not popular among public officials, simply because they have talked "home rule" so much, and with so little understanding of it, that they are obliged to take the position in opposition to state-wide commissions. But I am sure that the best results can be obtained, in states such as Illinois, Iowa, Wisconsin, Indiana, Ohio and the other Mississippi Valley states, by state commissions.

It is fair to assume that if out of 48 states in the Union 33 of them have commissions having jurisdiction over these various services, the trend is in that direction, and that it is reasonably correct. A large portion of the people may go wrong temporarily on a great many questions, but so large a portion as two-thirds of them are hardly likely to go wrong on fundamental questions, such as the question involved in the regulation of utilities. In the 15 states that are counted as not having commissions, we include Iowa, where the Iowa Railroad Commission has limited jurisdiction in electrical matters, such as transmission lines, and Nebraska, where the Nebraska State Railway Commission has jurisdiction over the issuance of securities only. The exact authority of the commissions, of course, varies considerably in the different states. *Extract from recent address of Samuel Insull.*

Cut-Throat Competition Gave Germany Her Preeminence in the Dyestuffs Industry

It was the usual habit of German dyestuff manufacturers, when they saw that a dyestuff was made successfully in the United States, to undersell in our market, when necessary, even at prices below the cost of production, and to continue doing this until the American manufacturer was forced to discontinue.

As soon as he was out of the market, the prices would be raised, even to above that which originally ruled.

What took place in the United States took place in other countries as well. The German Government has thus, through the dyestuff manufacturers, pursued a relentless fight against other nations in their building up of a dye industry. The activity of German dyestuff manufacturers has been so thorough that they induced certain of our own manufacturers, who needed dyes in their business, to exert their influence to keep the tariff as low as possible.

The foreign manufacturers maintained that dyestuffs should be considered raw material, and that it was therefore to our own manufacturers' interest to keep the tariff low. Most of them accepted this narrow-sighted policy and did not wake up to the results of their action until the war broke out and they were cut off from their usual sources of supply.—*Lancet-Clinic.*

Reduce Gas Consumption 2,500,000 Cu. Ft. Per Month in English Power Plant

Result Attained Through Regular Analysis of Exhaust Gases and Instructions to Engine Drivers to Drive by Pressure Gauge—Gas Consumption About 39 Cu. Ft. Per Kilowatt Hour

By means of regular analyses of the exhaust gases and instructions to the engine drivers to drive by the pressure gauge, the gas consumption was reduced from 15 million cu. ft. in March, 1914, to 12½ million cu. ft. in May of that year, the load remaining practically constant in an English power plant where gas engines operating on coal gas are used for generating electricity, according to a paper prepared for the Institution of Electrical Engineers of Great Britain by G. Earle.

Unusual Features in Design

Several unusual features are incorporated in the design, to facilitate the operation and also to eliminate certain common causes of breakdown. The engines are of the vertical single-acting 4-stroke-cycle tandem type, with the cylinders so arranged that the explosion stroke of one cylinder on a given piston rod is the suction stroke of the other. Each crank, therefore, receives a power impulse each revolution and the inertia of the moving parts on the upward stroke is absorbed by the compression of the charge in one or the other of the cylinders. The connecting rod is thus always in compression and little or no strain is thrown on the connecting rod bolts, which are said to be the causes of more engine failures than any other part.

Each engine has eight cylinders, the upper four being 16.5 in. in diameter and the lower four 1 in. less, to facilitate the withdrawal of the pistons and rods for cleaning purposes.

Gas is supplied to the engines from a battery of 60 waste-heat and 50 regenerative Otto ovens, 15 per cent of the total gas being available from the former and 40 per cent from the latter. The average gas pressure is about 10 in.

The gas leaving the benzole scrubbers contains about 900 grains of H_2S per 100 cu. ft. which would combine with the condensed moisture in the gases to form sulphuric acid. This would attack the valves and cylinders and also increase the danger of preignition. The gas is therefore purified by oxide of iron in four purifiers of the Wilbourne type, each 20 ft. square and 5 ft. deep, and holding 30 tons of oxide in two tiers of ordinary grids. From 2½ to 3 per cent of air is drawn in at the exhauster, which air has an important effect in revivifying the iron oxide.

The oxide is renewed every four months, while prior to the introduction of the air it was necessary to renew it every four weeks. The purifiers reduce the H_2S to less than 50 grains per cu. ft., and also remove the last traces of tar from the gas.

Auxiliary Air Supply Introduced in Mixing Chamber of Engine

The usual method of mixing gas and air by diluting the mixture with a certain percentage of exhaust gas was considered inefficient and an auxiliary air supply was introduced in the mixing chamber of the engine instead.

This supply is controlled by a diaphragm governor, and dilutes the gas in the mixing chamber by a certain percentage of air.

A further supply of air, controlled by hand from the driving platform of the engine, is admitted to the chamber of the governor valve where the diluted gas and air meet. After passing through the chamber of the governor valve the mixture is passed through a set of vanes to give it a rotatory motion, and also through a set of perforated plates.

The mixture was thus made most thorough, and overheating and preignition of the gas was eliminated. The engines were enabled to run up to and beyond their rated capacity without trouble. The gas consumption is approximately 39 cu. ft. per kilowatt hour.

News of the Gas Industry

Muskogee to Sell Natural Gas At 4 Cents a Thousand

The city of Muskogee will supply 4-cent gas for industrial consumption to plants that will use at least a half million cubic feet a day. The city council rejected the request of A. W. Lefeber, general manager of the Midland Valley railroad, for a contract for 4-cent gas. The refusal to make the contract was based on City Engineer H. H. White's estimate that the Midland Valley shops will not use more than 200,000 cu. ft. a day.

Three Propositions Before Citizens of Bellefontaine in Gas Plant Matter

There are three propositions open to the citizens of Bellefontaine, Ohio, in regard to the gas situation: To remodel the present municipal plant, the cost of which will be between $25,000 and $50,000 and increase the price of gas so that the plant will not be operated at a loss, to sell the plant and rights of franchise to a private corporation to manufacture gas or to sell the franchise to a corporation furnishing natural gas.

Supplementary Rate Schedule Authorized at Terre Haute

The public service commission of Indiana has issued an order, authorizing the Citizens Gas & Fuel Company, of Terre Haute, Ind., to file a supplementary schedule, which will provide a rate of 50 cents a thousand cubic feet for gas used by manufacturers and industrial enterprises in Terre Haute and West Terre Haute, when the customers use more than 50,000 cu. ft. a month. The new rate will apply to all gas used in addition to the first 50,000 cu. ft. a month.

Domestic Uses of Gas Featured in Boston Company's Catalog

The Boston Consolidated Gas Company, in its annual publication of gas information, recently issued, "bears down" on the multifarious uses of "the essence of coal" in the affairs of everyday home life. The catalog also contains handsome halftones in black and orange color printing, showing attractive domestic scenes in which gas is an important agent, and there is a large number of illustrations of lamps, ranges, heaters, irons, table devices, radiators and gas logs. The publication consists of 48 pages and cover, 5¼ by 7½ inches.

New Central States Company Asks Authorization for Purchase of Properties

The Central States Gas Company has filed a petition with the Public Service Commission of Indiana, asking approval of its proposed purchase of the Vincennes Gas Company for $365,000. The Central States Gas Company proposes to meet the purchase price with money from the sale of capital stock of the amount of $180,000 and first mortgage gold bonds of the parent company for $180,000.

The Central States Company also asked permission to buy the gas lines, services and meters belonging to Joseph A. Sloan, of Napoleon, Ohio, which are laid in Vincennes. The purchase price for this property is $80,000, which the buying company proposes to raise by sale of its stocks and bonds. The Central States Gas Company has just been incorporated in Indiana, with a capital stock of $1,000,000. Its president is William J. Hartnett, Fulton, N. Y., and Joseph A. Sloan is secretary. Other directors are Sidney Spitzer, Toledo, Ohio, Harry J. Sloan, Jesse F. Weideman, Clarence Rettig and Chauncey C. Schelling, all of Vincennes.

Compromise Schedules for South Bend and Mishawaka Approved

The Public Service Commission of Indiana has just entered an order, approving a compromise schedule of rates for the cities of South Bend and Mishawaka, Ind., from the Northern Indiana Gas & Electric Company. The commission's order sets out that the new compromise schedule is a reduction from the present rates to all users of gas, who consume less than 500,000 cu. ft. a month. These reductions range from 10 to 20 cents a thousand cu. ft. The new rates are to go into effect May 1, 1917. They are as follows:

	Gross	Discount	Net
First 10,000 cu. ft.	$1.00	$0.10	$0.90
Next 20,000 cu. ft.	0.90	0.10	0.80
Next 20,000 cu. ft.	0.80	0.10	0.70
Next 100,000 cu. ft.	0.70	0.10	0.60
Next 350,000 cu. ft.	0.60	0.10	0.50
All over 500,000 cu. ft.	0.55	0.10	0.45

The order provides a monthly minimum charge of 50 cents. The rates involved also apply to the little town of River Park, in St. Joseph County.

Tonawanda's Daily Sales Record

As a result of one day's drive on industrial gas appliances the Niagara Light, Heat & Power Company, at Tonawanda, N. Y., operated by Henry L. Doherty & Company, shows a sales record covering a wide range of appliances, and demonstrates the possibilities of a prolonged industrial fuel campaign in that city.

The following table shows the individual appliances sold as well as new services:

Services	3
Meters	9
Hotel ranges	2
Combination broiler & griddlers	2
Water heaters	2
Soldering furnaces	1
Ladle dryers	1
Domestic ranges	1
Brass furnaces	1
Gas Irons	9
Arcs	3
Radio lamps	4
Upright lamps	1

In addition the company has orders to pipe two hotels of forty and sixty outlets respectively and two domestic piping orders.

100 Per Cent Pride of Industry

You are a gas man. Have you 100 per cent "Pride of Industry?" asks the National Commercial Gas Association. How many items of the following list can you check as signs of your "Pride of Industry?"

Belonging to the N. C. G. A.
Studying some special line of gas work.
Reading some industrial gas journal.
Attending conventions whenever possible.
Following the reports, if attendance is not possible.
Encouraging organizations which are pushing the gas industry by showing my interest—
a. By sending favorable as well as unfavorable criticism.
b. By making suggestions.
c. By using such services as they offer.
Obtaining and using such material, *i. e.*, handbooks, charts, special services, as the N. C. G. A. and other central organizations publish for the benefit of the industry.
Boosting gas wherever possible to those who do not know its value and advantages.

Societies and Associations

THE NATIONAL COMMERCIAL GAS ASSOCIATION, prompted by a recent analysis of the gas lighting business which discloses the fact that in practically every section of the country the number of dwellings at present piped for gas only is far in excess of those wired for electricity, is planning to celebrate a National Gas Lighting Week again this year, from Sept. 27 to Oct. 2. The later date has been decided upon, as it was found that September, when the consumer, just returned from his vacation, is not yet ready to consider plans for the redecoration of his house, is an inadvisable time to attempt to arouse interest in the use of gas lighting. It is also found that the discount period in many companies is between the first and the tenth of the month, at which time a large number of consumers visit the companies' offices and show-rooms. The association urges every gas company to join in this concerted effort to place gas lighting before the public in a manner which will leave a favorable and lasting impression, and recommends that persistent efforts be made to interest the consuming public in the advantages of up-to-date gas lighting. It is further suggested that the companies prepare their publicity and selling plans well in advance of Lighting Week and begin their advertising considerably before Oct. 9. Many companies will find it advantageous to continue the campaign beyond Oct. 14, and there is no reason why this should not be done. However, it is advisable to concentrate the efforts during the period Oct. 9 to 14.

THE NATIONAL SAFETY COUNCIL has arranged the following program for the Fifth Annual Safety Congress, to be held in Detroit, Mich., Oct. 17-20; Oct. 16, special committee meetings; Oct. 17, registration of members and annual meeting of members, general round table discussion and universal danger sign committee meeting; Oct. 18, chemical, foundry, health service, iron and steel, mining, public utilities and steam railroad sectional meetings; Oct. 19, electric railway, health service, iron and steel, mining, paper and pulp manufacturers, steam railroad and textile sectional meetings; Oct. 20, cement, electric railway, employees benefit association, governmental, health service, iron and steel, logging, lumbering and woodwork, paper and pulp manufacturers, and public safety sectional meetings. The annual banquet will be held on the evening of Oct. 19. Headquarters will be at Hotel Statler. Among the papers to be presented are the following:

ACCIDENT PREVENTION IN THE COMMERCIAL DEPARTMENT OF A LARGE GAS COMPANY, BY C. W. CLABAUGH, vice-president, Omaha Gas Company, Omaha, Neb.

SAFETY WRINKLES AROUND A GAS WORKS, BY G. I. VINCENT, engineer, Des Moines Gas Company, Des Moines, Iowa.

PHYSICAL EXAMINATION OF EMPLOYEES, BY DR. WILBUR E. POST, chief medical adviser, Peoples Gas, Light & Coke Company, Chicago.

SAFETY IN COKE OVEN OPERATIONS, BY K. M. BURR, safety inspector, Illinois Steel Company, Gary, Indiana.

CARE OF WORKMEN EMPLOYED IN THE MANUFACTURE OF ANILINE AND BENZOL PRODUCTS, BY A. B. MITCHELL, Benzol Products Company, Marcus Hook, Pa.

The National Safety Council, an employers' organization, was started a little less than three years ago for the purpose of establishing a clearing house of information on accident prevention, sanitation, health conservation, etc. A remarkable result has come about; starting with 40 members the council now has more than 2,200, and has extended its influence to many foreign countries. The unique feature of the council's service is five bulletins a week to each member—250 a year—transmitting to the employer the best means and methods of reducing accidents. The development of the council's work has indicated the need for intensive study of the problems of various industries, so that the main feature of the meeting this year is sectional conferences; for instance, the gas industry members will be assembled in the Public Utilities Section. A new feature of the congress this year will be a safety exhibit, where the latest types of safety devices will be shown.

Personal Notes

J. B. ANDERSON, formerly of Baton Rouge, has been appointed superintendent of the Brockton Gas Light Company. He succeeded Joseph S. String, whose resignation was noted in last week's issue.

DR. GEORGE S. HESSENBRUCH, formerly assistant chief engineer of power plants of the Union Electric Light & Power Company of St. Louis, Mo., and superintendent of works of the St. Louis County Gas Company of Webster Groves, Mo., has severed his connection with the above companies and has opened offices in the Victoria Building, St. Louis, as consulting engineer. His intentions are to devote himself to a consulting practice on gas, gas works operation and construction, and particularly to gas coal by-products.

HENRY L. WEST, of New York City, formerly commissioner of the District of Columbia, has been engaged by the Michigan Gas Association to speak on the subject of "Preparedness" at the annual convention in Detroit, Sept. 21-22. Mr. West is well versed on this subject and comes direct from New York City through the Conference Committee of National Preparedness.

WILLIAM H. MATLACK has resigned as manager of the service department of Gas Industry and the Natural Gas Journal to enter the employ of the Gas Light Company of Augusta, Ga.

DEWITT CLINTON, treasurer of the Worcester Gas Light Company, was a speaker on the subject of training public accountants at the meeting preliminary to the opening of the Y. M. C. A. school of accountancy and business administration, at the Chamber of Commerce Hall, Worcester, Mass.

JOSEPH A. WELTON, for several years head chemist with the Grand Rapids Gas Company, has been appointed chief chemist in the by-product laboratory of the Republic Steel & Iron Company of Youngstown, Ohio.

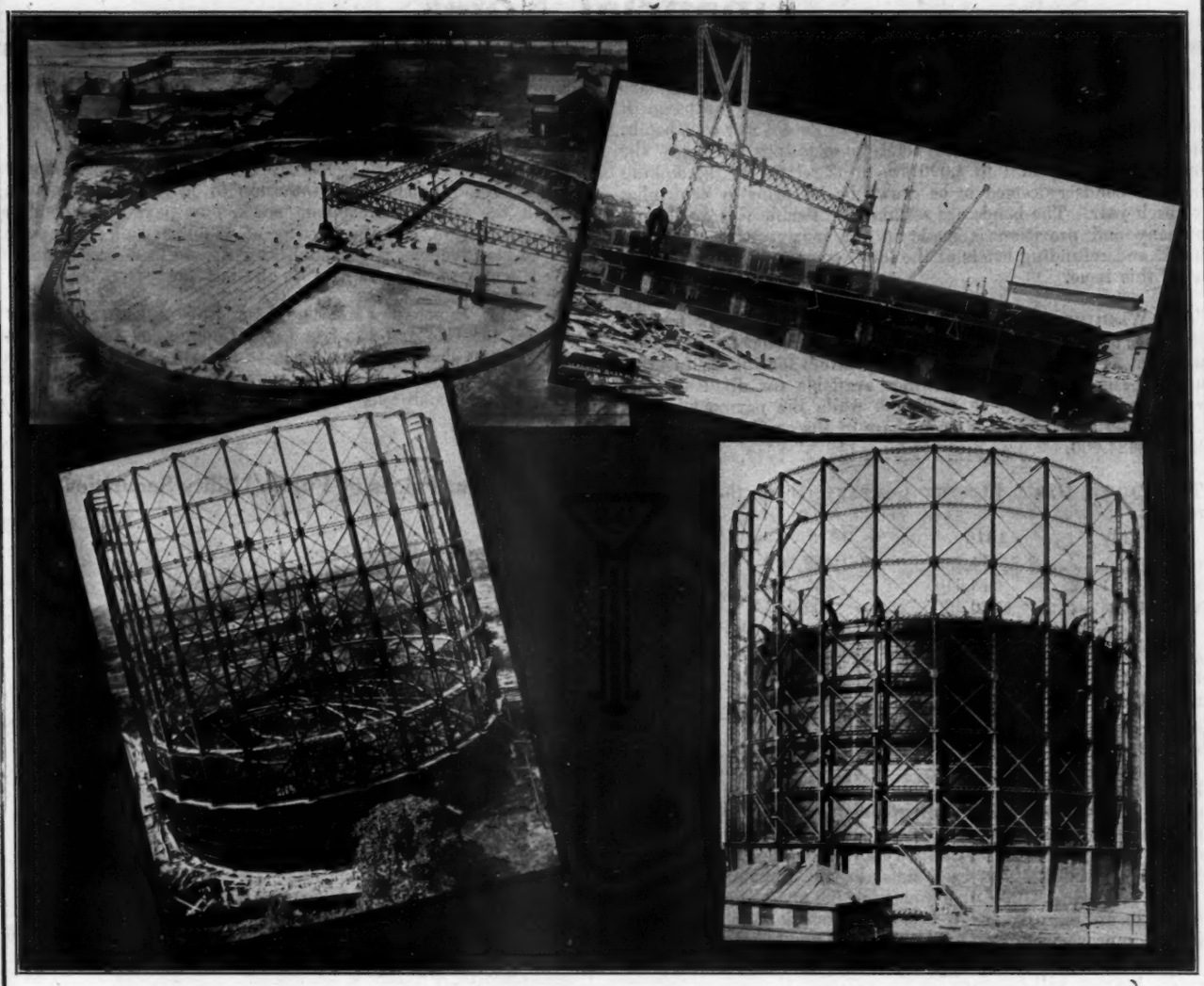
Construction Notes

WILLIMANTIC, CONN.—The Willimantic-Rockville Lighting Company is improving its gas service in different sections of the city. On Union street, from Maple to West, a four-inch main has been put in, and a larger pipe has been placed from Prospect street to connect with the main on East Main street.

FALL RIVER, MASS.—Permission has been granted to the Fall River Gas Company to lay gas pipes across Stafford road at intersection of Caroline street; across Oak Grove avenue at intersection of Lemuel street; across Brayton avenue, at intersection of Jackson street; across Albion street, at intersection of Donnelly street.

MUSKOGEE, OKLA.—City Engineer H. H. White has completed the survey for the gas pipe line from Brushy mountain to Muskogee. He expects to begin trenching for the laying of the pipe in the near future. It is announced that the work will be done by the city, the labor being hired by the day. Word has been received that all of the pipe has left the foundry and the initial shipments are expected daily.

TACOMA, WASH.—Extensions of the lines and improvements of the plants of the gas companies in Everett, Tacoma, and Olympia, involving a considerable investment, are contemplated by H. M. Byllesby & Company, the officers of which are at present on an inspection trip.



RITER-CONLEY COMPANY

STEEL CONSTRUCTION

PITTSBURGH

HELME & McILHENNY

1339-1349 Cherry St., Philadelphia, Pa.

ESTAB. 1848 H & McI High Grade Meters

GAS METERS

HINMAN DRUM STATION METERS, FOULIS GAS GOVERNORS

PREPAYMENT METERS

REPAIRING AND CONVERTING

PROMPT SHIPMENTS - - - - - CORRESPONDENCE SOLICITED

Financial Notes.

THE SAN FRANCISCO GAS & ELECTRIC COMPANY, a subsidiary of the Pacific Gas & Electric Company, has called for payment November 1 at 105 and interest $100,000 of its 4½ per cent bonds. There are $7,085,000 of these bonds outstanding, but only the bonds numbered from 1 to 4,000 are to be retired by the sinking fund, the bonds redeemed to be drawn by lot prior to September 1 of each year. The bonds are assumed by Pacific Gas & Electric Company and provision is made in the mortgage securing the general and refunding bonds of the latter company for the refunding of this issue.

THE WASHINGTON GAS LIGHT COMPANY, for the six months ended with July earned, net, after taxes and fixed charges, $416,000, the largest net in the history of the corporation for any six months. On this basis the 1916 net earnings available for dividends, before depreciation, would be $832,000, while the payment of the $4.80 quarterly dividends on each share of the capital stock would call for $624,000.

THE PACIFIC GAS & ELECTRIC COMPANY reports the following earnings:

July	1916	1915	Increase
Gross	$ 1,424,288	$ 1,482,767	*$58,479
Net	648,648	637,971	10,677
Sur. of Chgs.	310,460	307,913	2,547
From Jan 1			
Gross	$10,765,729	$10,686,205	$79,524
Net	4,798,263	4,823,997	*25,734
Sur. of Chgs.	2,431,465	2,383,776	47,689

*Decrease

THE NEW BEDFORD GAS & EDISON LIGHT COMPANY, in a petition filed with the state board of gas and electric light commissioners, asked for an approval of an issue of 3,180 additional shares of its capital stock. The price at which the stock is to be offered to stockholders has been fixed by the directors at $200. per share, par being $100. In its petition the company states that it desires to use the proceeds of this stock issue for the purpose of financing improvements contemplated in its plant and for paying off indebtedness previously incurred for laying wires and pipes. A public hearing will be given on the petition, the date of which will be announced later.

THE INTERMOUNTAIN RAILWAY, LIGHT & POWER COMPANY reports, for the twelve months ended July 31, gross earnings amounting to $202,416, increase $62,654; net $80,764, increase $26,134; surplus after charges $51,637, increase $19,154.

THE NEW ORLEANS RAILWAY & LIGHT COMPANY reports gross earnings for the six months ended June 30, amounting to $3,594,642; operating expenses $2,190,950; net $1,403,702; surplus $339,905.

THE EMPIRE GAS & FUEL COMPANY, through the Bankers Trust Company, has called for tenders until Sep. 27, of sufficient of its first mortgage collateral trust 6 per cent bonds to exhaust $350,000, which will be available for sinking fund November 1, when accepted bonds will be paid.

THE ITHACA GAS & ELECTRIC COMPANY has applied to the Upstate Public Service Commission for authority to purchase the $200,000 capital stock of the Norwich Gas & Electric Company.

CINCINNATI GAS & ELECTRIC COMPANY.—$4,500,000 first and refunding mortgage 5 per cent forty-year sinking fund bonds, Series A, due 1956, have been admitted to the New York Stock Exchange.

THE ITHACA GAS & ELECTRIC COMPANY has applied to the Upstate Public Service Commission for approval of the purchase of the capital stock of the Homer & Cortland Gas & Light Company for $147,000.

THE MILWAUKEE GAS LIGHT COMPANY.—$1,697,000 first mortgage twenty-five year 4 per cent bonds have been listed in the New York Stock Exchange.

THE CONSOLIDATED GAS, ELECTRIC LIGHT & POWER COMPANY OF BALTIMORE announces its intention to do its future financing through the sale of its common stock, now paying dividends at a 7 per cent rate, and the offering of $3,697,912 of the common stock to stockholders at par, indicates the decided growth in the earning power of this company in the last few years.

THE NEW BEDFORD, (MASS.) GAS & EDISON LIGHT COMPANY has asked the Gas and Electric Light Commission to approve an issue of 3,180 shares of new stock, to be sold at $200 per share. The proceeds of the sale are to be used to pay for extensive improvements and additions to plant.

Current Prices of Public Utility Securities.

	Bid	Asked
Adirondack Elec. P.	27	29
Adirondack Elec. P. pf.	80	82
American Gas	120	123
*American Gas & Electric	154	157
*American Gas & Electric pf.	49	51
American Light & Traction	378	382
American Light & Traction pf.	110	112
American Power & Light	69	71
American Power & Light pf.	84	85½
American Public Utilities	42	47
American Public Utilities pf.	73	76
Amer. Water W. & Elec.	7½	8½
Amer. W. W. & E. part'g pf.	20	23
Amer. W. W. & E. 1st pf.	60	64
Carolina Pow. & Lt.	27	29
Carolina Pow. & Lt. pf.	98	100
Cities Service	290	293
Cities Service pf.	86¾	87¾
Colorado Power	25	26½
Colorado Power pf.	99½	101½
Commonwealth, Pr. Ry. & Lt.	62	64
Commonwealth, Pr. Ry. & Lt. pf.	83½	85½
Denver Gas & Electric gen 5s.	96	98
Electric Bond & Share pf.	101	104
Empire District El. pf.	88½	92½
Federal Light & Traction	10	13
Federal Light & Traction pf.	44	48
Gas & Electric Securities	290	—
Gas & Electric Securities pf.	95	100
Northern States Power	99	101
Northern States Power pf.	96	97½
North. Ont. Lt. & P.	15	18
North. Ont. Lt. & P. pf.	60	65
Ozark Power & Water	43	46
Pacific Gas & Electric	58½	59
Pacific Gas & Electric pf.	90	92
Republic Ry. & Light Co.	37	39
Republic Ry. & Light Co. pf.	74	76
*Standard Gas & Electric	15	15½
*Standard Gas & Electric pf.	40	41
So. Cal. Edison	92	93
So. Cal. Edison pf.	105	108
Tennessee Ry., Light & Power	10	11
Tennessee Ry., Light & Power pf.	48	50
Toledo Trac., Light & Power	40	43
Toledo Trac., Light & Power pf.	78	81
United Light & Railways	52	55
United Light & Railways 1st pf.	77	78
Western Power	20	21
Western Power pf.	69½	71

*Par value $50